

N 9 3 - 2 6 9 6 4

ROBERT KOZAR

10-21-92

## **Plum Brook Facilities**

### **Spacecraft Propulsion Research Facility ( B-2 )**

The facility was designed to test space vehicles and upper stage rocket engines in a simulated space environment. The vacuum test chamber can accommodate space vehicles up to 22' diameter by 50' long.

This facility is to be restored as part of the advanced cryogenic engine program. Additional facility upgrades will be made which will allow the use of this facility to perform integrated engine non-nuclear testing.

- Cold flow distribution verification and thermal investigations
- Solar irradiation / cold soak thermal cycling verification
- Verification of structural static loading

### **Hydrogen Heat Transfer Facility ( HHTF )**

### **( Currently the Hypersonic Tunnel Facility )**

When restored to its original capability of handling large flows of hot hydrogen, this facility will be used as a testbed to perform NTR nozzle performance verification using hot hydrogen at altitude.

- Verification of simulation model results
- Verification of thermal and vibration performance
- Verification of nozzle erosion / corrosion characteristics performance

## **Plum Brook Facilities**

### **Rocket Dynamics and Control Facility ( B-3 )**

This facility was designed for altitude tests on various components for large rocket engines such as would be needed for interplanetary travel. It was used to test the structural integrity of the Centaur-Viking vehicle and its protective shroud. The existing facility presently includes a 200,000 gallon liquid hydrogen storage tank. NPO intends to use this facility for propulsion system vibration testing with altitude simulation.

- Verification of structural dynamic loading
- Cold Flow stability in vibration environment

### **Cryogenic Propellant Tank Site ( K-Site )**

This facility has been used as a research test chamber where liquid hydrogen rocket fuel tanks up to 18' in diameter were tested in a 25' diameter spherical thermal vacuum chamber. This facility is currently operational and has been used for recent slush hydrogen work associated with the NASP program

It will provide a facility for NTP and NEP propellant tank testing.

- Verification of tank insulation performance
- Functional leak testing of filler plumbing
- Verification of structural and vibration performance
- Acent / decent profile testing
- Slush hydrogen investigations

## **Plum Brook Facilities**

### **Space Power Facility ( SPF )**

This facility is a very large vacuum chamber ( 100' diameter, 120' height ) for testing spacecraft and / or their subsystems and components in a simulated space environment. It was specifically designed for testing space nuclear electric power systems in a hard vacuum, cold wall environment. It is intended to use this facility for nuclear electric propulsion component and integrated system tests.

- Non-nuclear system tests
- Functional testing of NEP components
- Heat source, radiators, power conversion, PMAD, thrusters
- Functional testing of integrated NEP systems
- Functional testing of the NEP stage